Ago1 Interacts with RNA polymerase II and binds to the promoters of actively transcribed genes in human cancer cells.

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Public Summary:
Argonaute proteins are often credited for their cytoplasmic activities in which they function as central mediators of the RNAi platform and microRNA (miRNA)-mediated processes. They also facilitate heterochromatin formation and establishment of repressive epigenetic marks in the nucleus of fission yeast and plants. However, the nuclear functions of Ago proteins in mammalian cells remain elusive. In the present study, we combine ChIP-seq (chromatin immunoprecipitation coupled with massively parallel sequencing) with biochemical assays to show that nuclear Ago1 directly interacts with RNA Polymerase II and is widely associated with chromosomal loci throughout the genome with preferential enrichment in promoters of transcriptionally active genes. Additional analyses show that nuclear Ago1 regulates the expression of Ago1-bound genes that are implicated in oncogenic pathways including cell cycle progression, growth, and survival. Our findings reveal the first landscape of human Ago1-chromosomal interactions, which may play a role in the oncogenic transcriptional program of cancer cells.

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